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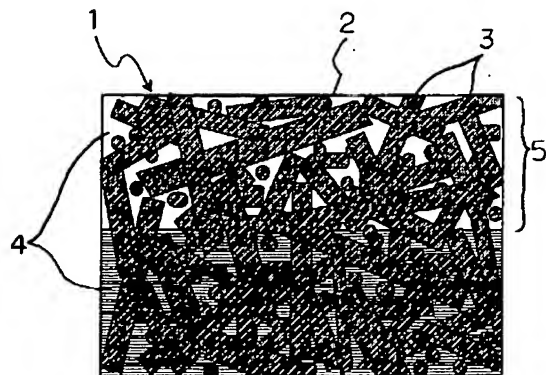
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(54) 【発明の名称】 窒化珪素質耐食性部材及びその製造方法

(57) 【要約】

【課題】耐熱性に優れた窒化珪素質焼結体からなり、パーティクルの発生を抑制し得る窒化珪素質耐食性部材とその製造方法を提供する。

【解決手段】陽イオン不純物が0.5重量%以下の窒化珪素原料粉末に対して、少なくとも0.5重量%以上の希土類元素酸化物を添加混合した混合物を所定形状に成形、焼成して作製された相対密度98%以上の窒化珪素質焼結体の少なくとも塩素系腐食ガス或いはそのプラズマに晒される面を塩素および/または水素を含むガス雰囲気中で、800～1900℃で熱処理して粒界相を除去し、接触表面から10μm以上の深さにわたり、少なくとも焼結助剤及び不純物を含む粒界相が、表面から1mmの深さ位置における粒界相に対して面積比率で3分の1以下に除去した粒界相除去層を形成する。



ATTORNEY-CLIENT PRIVILEGED COMMUNICATION

Tom,

Here is one of several data summaries from Japanes patent applications.

(21)Application number: 10079780

(71)Applicant: KYOCERA CORP

(22)Date of filing: 26.03.1998

(72)Inventor: YOSHIDA MAKOTO

(54) SILICON NITRIDE CORROSION RESISTANT MEMBER AND ITS PRODUCTION

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a silicon nitride corrosion resistant member consisting of silicon nitride sintered body excellent in heat resistance and capable of inhibiting the generation of particles, and further to provide a production method thereof.

SOLUTION: This silicon nitride corrosion resistant member is obtained by compacting a mixture obtained by adding at least 0.5 wt.% rare earth oxide to a silicon nitride raw material powder containing 0.5 wt.% cationic impurity, and mixing the raw material powder with the added rare earth oxide to form a prescribed shape, firing the obtained compact to provide a silicon nitride sintered body 1 having 98% relative density, heat-treating at least a face to be exposed to chlorine-based corrosive gas or a plasma, of the silicon nitride sintered body 1 in an atmosphere containing chlorine and/or hydrogen at 800-1,900°C to remove a grain boundary phase and to form a boundary phase-removed layer 5 regulated so that the boundary phase 4 containing at least a sintering adjuvant and an impurity over the depth of 10 μ m from the contacting surface 2 may be removed so as to be 1/3 times as much as that of the boundary phase at the depth of 1 mm from the surface expressed in terms of a surface ratio.

Etch conditions: BCl₃, 100sccm, RIE 1.8kW, 4 Pa. 240hr exposure

Sintering Aid	Relative density	Heat treat Temp	Time	Gas	Depth etched	Particle count per 8" wafer
試料 No.	焼結助剤 残部は Si ₃ N ₄ (重量%)	相対 密度 (%)	熱処理条件 温度 時間 雰囲気 (℃) (hr)	粒界相 除去層 の厚さ (μm)	X ₁ — X ₂	パーティクル 発生量 個/8inch ウエハ
* 1	Y ₂ O ₃ 7.0	99.0	処理なし	0	1.0	28500
* 2	" "	"	700 20 Cl ₂	3	0.5	16800
3	" "	"	800 20 Cl ₂	12	0.2	800
4	" "	"	1000 20 Cl ₂	23	0.2	600
* 5	" "	"	1300 5 Cl ₂	8	0.6	8100
6	" "	"	1300 10 Cl ₂	18	0.3	700
7	" "	"	1300 20 Cl ₂	30	0.1	300
8	" "	"	1300 30 Cl ₂	36	0.1	200
9	" "	"	1500 20 Cl ₂	41	0.1	200
10	" "	"	1700 20 Cl ₂	56	0.1	200
* 11	Yb ₂ O ₃ 0.3	93.0	1300 20 H ₂	51	0.0	測定不可
12	Yb ₂ O ₃ 0.7	98.0	1300 20 H ₂	20	0.2	800
13	Yb ₂ O ₃ 2.0	98.5	1300 20 H ₂	26	0.3	900
14	Yb ₂ O ₃ 8.0	98.7	1300 20 H ₂	23	0.1	600
* 15	Lu ₂ O ₃ 5.0	99.2	700 20 H ₂	6	0.6	3900
16	" "	"	800 20 H ₂	12	0.3	800
17	" "	"	1300 20 H ₂	36	0.1	600
18	" "	"	1700 20 H ₂	82	0.1	300
* 19	Yb ₂ O ₃ 7.0	99.0	2000 20 Cl ₂	150	0.0	測定不可

Measurem
ent not
possible

Measurem
ent not
possible

* 印は本発明の範囲外の試料を示す。
Table 1. Response to BCl₃ plasma